

Chapter 1

Introduction

Section 3001(b)(3)(A)(ii) of the Resource Conservation and Recovery Act (RCRA) excludes "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA, pending completion of a Report to Congress required by §8002(p) and a determination by the EPA Administrator either to promulgate regulations under Subtitle C or that such regulations are unwarranted (as required by §3001(b)(3)(C)). In 1985, EPA published the required Report to Congress on solid wastes from mineral extraction and beneficiation.¹ On July 3, 1986 (51 FR 24496), EPA published a determination that regulation of such wastes under Subtitle C of RCRA was not warranted.

This report has been prepared in response to the requirements of §3001(b)(3) and §8002(p) that EPA study solid waste from mineral processing operations that were included within the exemption -- referred to as special wastes -- and prepare a Report to Congress on the findings of the study. This introduction provides: (1) a description of the scope of the mineral processing waste exemption; and (2) an overview of the content and organization of this report.

1.1 The Scope of the Mineral Processing Waste Exemption

On October 21, 1976, Congress enacted the Resource Conservation and Recovery Act (RCRA) (Pub. L. 94-580). Section 3001 of RCRA mandated that the EPA Administrator "promulgate regulations identifying characteristics of hazardous waste, and listing particular hazardous wastes which shall be subject to the provisions of this subtitle." Section 3004 required the Administrator to promulgate standards applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities.

In response to these requirements, EPA proposed regulations for managing hazardous wastes under Subtitle C of RCRA on December 18, 1978 (43 FR 58946). In this regulatory proposal, EPA proposed to defer most of the RCRA Subtitle C requirements for six categories of wastes, which it termed "special wastes," until information could be gathered and assessed and the most appropriate regulatory approach determined. EPA identified mining wastes as one of six such "special wastes" that were generated in large volumes, were thought to pose less risk to human health and the environment than wastes regulated as hazardous wastes, and for which the proposed technical requirements implementing Subtitle C might not be appropriate.²

In 1979, Congress began work on reauthorization of RCRA. During the reauthorization process, Rep. Thomas Bevill (Alabama) offered an amendment (now frequently referred to as the Bevill Amendment) which, among other things, modified §3001 to temporarily exempt "solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and uranium ore" (along with two other categories of waste) from Subtitle C regulation, pending completion of certain studies. On October 12, 1980, Congress enacted the Solid Waste Disposal Act Amendments of 1980 (Pub. L. 96-482), which added §3001(b)(3)(A)(i-iii) (the Bevill Amendment) to RCRA.³ These amendments also added §8002(p), which required the Administrator to study the adverse effects on human health and the environment, if any, of wastes from the disposal and utilization of "solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ores," and submit

¹ U. S. Environmental Protection Agency, 1985. Report to Congress on Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining, and Oil Shale, EPA/530-SW-85-033, Washington, D.C.

² The other five proposed "special wastes" specifically identified in the 1978 proposed rule were cement kiln dust waste; utility waste; phosphate rock mining, beneficiation, and processing waste; uranium mining waste; and oil and gas drilling muds and oil production brines.

³ The 1980 Amendments also contained §3001(b)(3)(B)(iii), which provides authority for EPA to regulate the use of solid waste from the extraction, beneficiation, and processing of phosphate rock or overburden from uranium mining in construction or land reclamation, so as to prevent radiation exposure which presents an unreasonable risk to human health.

a Report to Congress on its findings. In addition, the 1980 amendments added §3001(b)(3)(C), which requires the Administrator to make a regulatory determination, within six months of the completion of the §8002(p) studies, whether to regulate the wastes under Subtitle C of RCRA.

In response to the 1980 RCRA amendments, on November 19, 1980, EPA published an interim final amendment to its hazardous waste regulations to reflect the provisions of the Bevill Amendment (45 FR 76618). The regulatory language incorporating the exclusion was identical to the statutory language, except EPA added the phrase "including coal." In the preamble to the amended regulation, however, EPA tentatively interpreted the exclusion to include "solid waste from the exploration, mining, milling, smelting, and refining of ores and minerals."

In 1985, EPA proposed to narrow the scope of the exclusion as it applied to mineral processing wastes (50 FR 40292, October 2, 1985), although EPA subsequently withdrew this proposal (51 FR 36233, October 9, 1986). The Agency's decision to withdraw its 1985 proposal was challenged in court (*Environmental Defense Fund v. EPA*, 852 F.2d 1316 (D. C. Cir. 1988), cert. denied 109 S. Ct. 1120 (1989) (*EDF v. EPA*)). In this case, the petitioners contended, and the Court of Appeals agreed, that EPA's interpretation of the scope of the Bevill amendment as it applies to mineral processing wastes was "impermissibly over-broad." In reaching this decision, the Court found that Congress intended the term "processing" in the Bevill amendment to include only those wastes from processing ores or minerals that met the "special waste" criteria -- that is, "high volume, low hazard" wastes. 852 F.2d at 1328-29.

Through a rulemaking process completed with the publication of a final rule on January 23, 1990 (55 FR 2322),⁴ the Agency has established that the temporary exemption from Subtitle C requirements established by the Bevill Amendment for mineral processing wastes and, therefore, the scope of this report is limited to 20 mineral processing wastes generated by approximately 91 facilities located within 29 states, representing 12 mineral commodity sectors, as follows:

- ! Alumina -- red and brown muds from bauxite refining
- ! Chromium (Sodium chromate/dichromate) -- treated residue from roasting/leaching of chrome ore
- ! Coal gas
 - gasifier ash from coal gasification
 - process wastewater from coal gasification
- ! Copper
 - slag from primary processing
 - calcium sulfate wastewater treatment plant sludge from primary processing
 - slag tailings from primary processing
- ! Elemental phosphorus -- slag from primary production
- ! Ferrous Metals (iron and carbon steel)
 - iron blast furnace air pollution control dust/sludge
 - iron blast furnace slag
 - basic oxygen furnace and open hearth furnace air pollution control dust/sludge
 - basic oxygen furnace and open hearth furnace slag
- ! Hydrofluoric acid
 - fluorogypsum
 - process wastewater

⁴ This rulemaking process also included publication of a proposed rule on October 20, 1988 (53 FR 41288), a proposed rule on April 17, 1989 (54 FR 15316), a final rule on September 1, 1989 (54 FR 36592), and a proposed rule on September 25, 1989 (54 FR 39298).

- ! Lead -- slag from primary processing
- ! Magnesium -- process wastewater from primary magnesium processing by the anhydrous process
- ! Phosphoric acid
 - phosphogypsum
 - process wastewater
- ! Titanium tetrachloride -- chloride process waste solids
- ! Zinc -- slag from primary processing

All other solid wastes from the processing of ores and minerals were removed from the Mining Waste Exclusion as of the effective date of the January 23, 1990 final rule (July 23, 1990), and are subject to regulation as hazardous wastes if they exhibit one or more characteristics of hazardous waste.

A summary of the important events in the rulemaking process and of the criteria that have been developed by the Agency to identify the 20 special wastes from mineral processing operations that are the subject of this report is presented in Appendix A (in Volume III) to this document.

1.2 Contents and Organization

This report addresses the following eight study factors required by §8002(p) of RCRA for the 20 mineral processing wastes listed above:

1. The source and volumes of such materials generated per year;
2. Present disposal and utilization practices;
3. Potential danger to human health and the environment from the disposal and reuse of such materials;
4. Documented cases in which danger to human health or the environment has been proved;
5. Alternatives to current disposal methods;
6. The costs of such alternatives;
7. The impacts of these alternatives on the use of phosphate rock, uranium ore, and other natural resources; and
8. The current and potential utilization of such materials.

In addition, the report includes a review of applicable state and federal regulations so that decisions that derive from the report avoid duplication of existing requirements.

The report consists of three volumes, as follows:

Volume I: Summary and Findings

- ▼ This volume provides an overview of the methods used to conduct the study, the decision criteria used by EPA in reaching its tentative conclusions, and the Agency's preliminary findings with respect to each of the 20 mineral processing wastes that are within the scope of the study.

Volume II: Methods and Analyses

- ▼ Chapter 1, Introduction, summarizes the scope, contents, and organization of the report.
- ! Chapter 2, Methods and Information Sources, presents an overview of the data sources used to prepare this report and the methods used to interpret these data.
- ! Chapters 3 through 14, summarize the information and analysis performed with respect to the study factors for the 20 mineral processing wastes, organized by 12 commodity sectors, as follows:
 - Alumina
 - Chromium (sodium chromate and dichromate)
 - Coal gas
 - Copper
 - Elemental phosphorus
 - Ferrous metals (iron and carbon steel)
 - Hydrofluoric acid
 - Lead
 - Magnesium
 - Phosphoric acid
 - Titanium tetrachloride
 - Zinc

Each of these 12 chapters has seven sections. The first section provides a brief overview of the industry, including the types of production processes used and the number and location of operating facilities. The second section summarizes information on waste characteristics, as well as waste generation and management practices (study factors 1 and 2), while the third section provides a discussion of potential for and documented cases of danger to human health or the environment (study factors 3 and 4). The fourth section summarizes applicable federal and state regulatory controls (as suggested by § 8002(p) of RCRA, independent of the eight study factors). The fifth section discusses alternative waste management practices and potential utilization (study factors 5 and 8), while the sixth section discusses costs and impacts of alternative practices (study factors 6 and 7). The seventh and final section of each chapter summarizes the findings of the study for each commodity sector and the special waste(s) generated therein.

Volume III: Appendices

- ! Appendices A - E present additional information on the history of the Mining Waste Exclusion for mineral processing wastes; significant EPA data collection activities; risk assessment methodology and assumptions; existing regulatory controls; and cost and economic impact assessment methodology, assumptions, and results.

Additional documentation regarding the methods, data sources, and assumptions used in preparing this report and the analyses contained herein may be found in the RCRA docket (docket number F-90-RMPA-FFFFF).